

Some Trematodes of Fishes from the Central Equatorial Pacific

EDWIN S. IVERSEN¹ and EARL E. HOVEN²

THIS REPORT is based on a collection of trematodes from marine fishes captured in the vicinity of the Line Islands. All the trematode species listed are believed to constitute first records from this area, and some are first reports from new hosts. Collections were made in 1955 during exploratory tuna fishing by trolling and longlining. These fishing surveys were carried out by Pacific Oceanic Fishery Investigations (POFI), a branch of the U. S. Fish and Wildlife Service, as one phase of a program designed to determine the distribution and abundance of tunas in the Pacific. The Line Islands from which this material was collected are: Christmas, Fanning, Washington, and Palmyra islands, and Kingman Reef. They extend in a northwesterly direction from 2° N. latitude, 157° W. longitude to 6° N. latitude, 163° W. longitude.

All specimens, except the hemiurids, were identified through the kind efforts of Dr. Harold W. Manter, Department of Zoology, University of Nebraska. Unfortunately facilities were not available aboard ship for proper preservation of such material; as a result many of the specimens were identified with difficulty and some could not be accurately identified. Dr. Donald C. Matthews, Department of Zoology, University of Hawaii, very kindly provided sections of the encysted didymocystid included herein. Thanks are extended to E. Dixon Stroup, POFI, for making the photographs used in this report. All collections have been deposited in the U. S. National Museum.

¹ Formerly with Pacific Oceanic Fishery Investigations, Honolulu, T. H., presently with Marine Laboratory, University of Miami, Coral Gables, Fla. Manuscript received September 27, 1956.

² Pacific Oceanic Fishery Investigations, Honolulu, T. H.

Order MONOGENEA

Family MICROCOTYLIDAE

Neothoracocotyle acanthocybii

(Meserve, 1938)

SYNONYMS: *Gotocotyla acanthocybii* Meserve, 1938.

HOST: Wahoo, *Acanthocybium solandri* (Cuvier and Valenciennes).

LOCATION: Between gill filaments.

LOCALITY: Kingman Reef, 6° 20' N., 162° 30' W.

SPECIMENS: USNM Helm. Coll. No. 38132.

PREVIOUSLY REPORTED HOSTS AND LOCALITIES: *Acanthocybium solandri* from the Galapagos Islands.

DISCUSSION: Since these parasites are located between the gill filaments, they are found only by rather close scrutiny. Other duties while at sea prevented a careful record of the number of infected fish. The number of worms per host is probably large and the rate of infestation high. Hargis (1956), who has erected the genus *Neothoracocotyle*, reported the new combination.

Family CAPSALIDAE

Capsala poeyi (Vigueras, 1935) Price, 1938

SYNONYMS: *Tristomum poeyi* Vigueras, 1935.

HOST: Black marlin, *Makaira ampla*³ (Poey).

LOCATION: Outside surface on isthmus and second dorsal fin.

LOCALITY: 04° 48' N., 160° 37' W. (vicinity of Washington Island).

³ Identification of the Pacific *M. ampla* was based on an unpublished key provided by Dr. William F. Royce. As this paper goes to press, it is apparent that there is considerable disagreement concerning the classification of the marlins.

SPECIMENS: USNM Helm. Coll. No. 38131.

PREVIOUSLY REPORTED HOSTS AND LOCALITIES: Reported from the same species of host off Havana, Cuba, by Vigueras (1935).

Capsala biparasitica (Goto, 1894)
Price, 1938

SYNONYMS: *Tristoma biparasitica* Goto, 1894.

HOST: Yellowfin tuna, *Neothunnus macropterus* (Temminck and Schlegel).

LOCATION: Firmly attached to carapace of copepods found in gills.

LOCALITY: 02° 14' N., 159° 59' W. (vicinity of Christmas Island).

SPECIMENS: USNM Helm. Coll. No. 38134.

PREVIOUSLY REPORTED HOSTS AND LOCALITIES: Goto collected this species of trematode from a copepod (*Parapetalus* sp.) on *Thynnus albacora* from Misaki, Japan.

DISCUSSION: The copepod involved in the present record is *Elytrophora* sp. A comparison of these host records is of particular interest because the trematode is a hyperparasite and because in each collection both the copepod hosts are caligid copepods and the fish hosts are closely related.

Family HEXASTOMATIDAE

Hexostoma grossum (Goto, 1894)
Sproston, 1946

SYNONYMS: *Hexacotyle grossa* Goto, 1894.

HOST: Bigeye tuna, *Parathunnus sibi* (Temminck and Schlegel).

LOCATION: On gills.

LOCALITY: 02° 45' N., 158° 05' W.

SPECIMENS: USNM Helm. Coll. No. 38133.

PREVIOUSLY REPORTED HOSTS AND LOCALITIES: On gills of *Thynnus* sp. from Misaki, Japan (Goto, 1894); type host corrected to *Parathunnus sibi* and reported on gills of *Katsuwonus vagans* and *Thunnus orientalis*, and on *Seriola quinqueradiata* from Japan (Ishii and Sawada, 1938).

Order DIGENEA

Family HEMIURIDAE

Hirudinella marina Garcin, 1730

SYNONYMS: Nigrelli and Stunkard (1947) include a very lengthy list of possible synonyms of this species.

HOST: Yellowfin tuna, *Neothunnus macropterus* (Temminck and Schlegel).

LOCATION: In stomach.

LOCALITY: 06° 20' N., 162° 30' W. (vicinity of Kingman Reef).

PREVIOUSLY REPORTED HOSTS AND LOCALITIES: Nigrelli and Stunkard (1947) include a long list of hosts, mostly of scombriform fishes, including *N. macropterus* from C. San Lucas, Lower California, Pacific.

DISCUSSION: In the course of the examination of stomach contents of yellowfin and bigeye tuna from the central Pacific, King and Ikehara (1956) encountered large muscular trematodes. They report an infection rate of 32 per cent for 166 bigeye and 26 per cent for the 439 yellowfin they examined. Since Nigrelli and Stunkard recognize only two species of *Hirudinella*, one in the wahoo, *H. ventricosa*, and one in other hosts, *H. marina*, it is very likely that these worms belong to the latter species.

Hirudinella ventricosa Pallas, 1774

SYNONYMS: Nigrelli and Stunkard (1947) list nine possible synonyms.

HOST: Wahoo, *Acanthocybium solandri* (Cuvier and Valenciennes).

LOCATION: Stomach.

LOCALITY: Christmas, Fanning, Washington, Palmyra islands, and Kingman Reef.

PREVIOUSLY REPORTED HOSTS AND LOCALITIES: *Acanthocybium solandri* in the Atlantic and Pacific; from the Pacific it has been reported from Panama, Mexico, Ecuador, and the Marianas Islands (Nigrelli and Stunkard, 1947).

DISCUSSION: Nigrelli and Stunkard (1947) have made a thorough study of this genus and

regard all *Hirudinella* reported from the wahoo as belonging to a single species, *H. ventricosa* Pallas. In an examination of 220 wahoo stomachs from the Line Islands, Iversen and Yoshida (1957) found a 98.2 per cent infection of these parasites. The hosts ranged in size from 108 to 172 cm. and as many as 17 of the worms were found in a single stomach, with 2 per host occurring most frequently.

H. ventricosa may be present elsewhere in the Pacific, for Edmondson (1946) states in respect to the Hawaiian region, that "An undetermined species of trematode commonly occurs in the stomach of the Ono, *Acanthocybium solandri* (Cuvier)." These flukes were about 1 inch long when partially contracted. Kishinouye (1923) in speaking of wahoo from Japan says "A large distomum, about 8 cm. in length, is almost always found in the stomach."

Family DIDYMOZOONIDAE

Didymocystis acanthocybii

Yamaguti, 1938

HOST: Wahoo, *Acanthocybium solandri* (Cuvier and Valenciennes).

LOCATION: Base of gill arches and on operculum.

LOCALITY: Christmas, Fanning, Washington, Palmyra islands, and Kingman Reef.

SPECIMENS: USNM Helm. Coll. No. 38171.

PREVIOUSLY REPORTED HOSTS AND LOCALITIES: At base of gill arch of *Acanthocybium sara* (Lay et Bennett); Pacific, Japan, Yamaguti (1938).

DISCUSSION: Of the 104 wahoo examined, 53 revealed conspicuous cysts of this parasite (Fig. 1). The fish ranged in size from 86 to 174 cm., and specimens of all sizes within this range were found to be infected. Figure 2 shows the relationship of the paired worms within the cyst.

Didymocystis sp.

HOST: Yellowfin tuna, *Neothunnus macrop-*

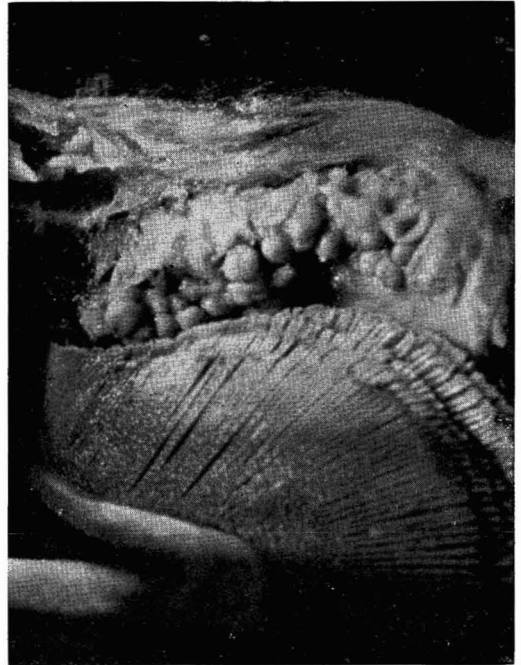


FIG. 1. Photograph of encysted *Didymocystis acanthocybii* on the side of the head of a wahoo (gill cover removed).

terus (Temminck and Schlegel).

LOCATION: On gill filaments.

LOCALITY: 00° 28' N., 157° 48' W.

SPECIMENS: USNM Helm. Coll. No. 38172.

DISCUSSION: The condition of specimens does not permit identification, but they resemble *D. wedli* Ariola, 1902, more closely than others. The infection rate of yellowfin is probably not high.

DISCUSSION

Concomitant studies of hosts and parasites from different geographic areas have been reviewed by Metcalf (1929) and Manter (1955), who have presented considerable evidence that parasites reflect the distribution and way of living of their hosts. A basic problem in the study of some pelagic fishes is to determine whether the population of each important species is continuous throughout its range or whether it is composed of a number of independent or semi-independent

units. In this connection these records, especially of Monogenea which are host specific, are of interest. *Capsala biparasitica* from yellowfin tuna in Japan and the Line Islands, *Hexastoma grossum* from bigeye in Japan and the Line Islands, *Neothoracocotyle acanthocybii* from wahoo in the Line and Galapagos islands, and *Capsala poeyi* from the black marlin in the Atlantic and Pacific, all suggest that these stocks of fish are not, or were not, completely independent.

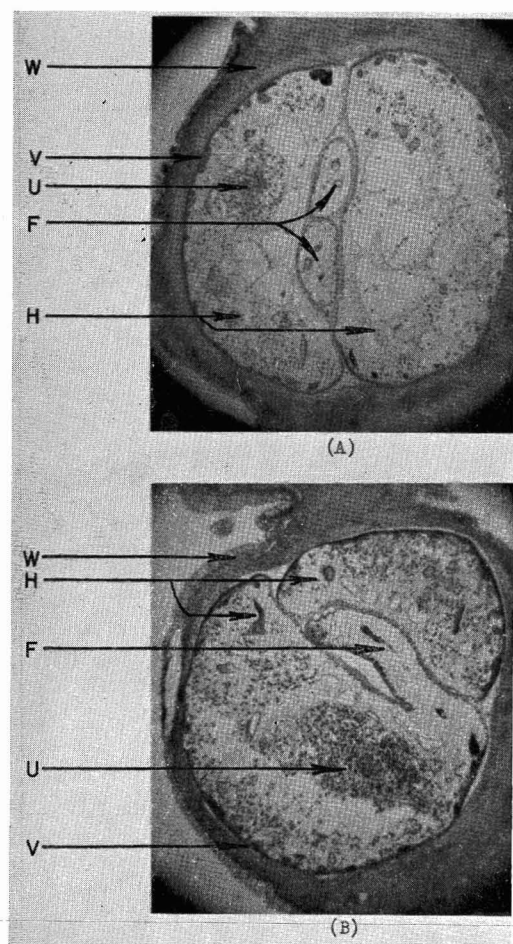


FIG. 2. *Didymocystis acanthocybii*. (A) Photomicrograph of a cross section through two trematodes showing the host tissue (W) surrounding the cyst, the forebodies (F), the hindbodies (H), the uterus (U), and vitellarium (V) of each. (B) Photomicrograph of a section through two trematodes showing the forebody of one in sagittal section. 10 microns.

REFERENCES

- EDMONDSON, C. H. 1946. *Reef and Shore Fauna of Hawaii*. Bernice P. Bishop Museum Special Publication 22, iv + 381 pp.
- GOTO, S. 1894. Studies on the ectoparasitic trematodes of Japan. *Tokyo Imp. Univ., Col. Sci. Jour.* 12(4): 263-295.
- HARGIS, W. J., JR. 1956. Monogenetic trematodes of Gulf of Mexico fishes. Part XII. The family Gastrocotylidae Price, 1943. *Bul. Mar. Sci. Gulf and Caribbean* 6(1): 28-43.
- ISHII, N., and T. SAWADA. 1938. Studies on the ectoparasitic trematodes. *Livro Jub. Lauro Travassos*. Pp. 231-243. Rio de Janeiro.
- IVERSEN, E. S., and H. O. YOSHIDA. 1957. Notes on the biology of the wahoo in the Line Islands. *Pacific Sci.* 11(4): 370-379.
- KING, J. E., and I. I. IKEHARA. 1956. A comparative study of the food of bigeye and yellowfin tuna in the central Pacific. *U. S. Fish and Wildlife Ser., Fishery Bul.* 57(108): 61-85.
- KISHINOUE, K. 1923. Contributions to the comparative study of the so-called scombroid fishes. *Tokyo Imp. Univ., Col. Agr. Jour.* 8(3): 293-475.
- MANTER, H. W. 1955. The zoogeography of trematodes of marine fishes. *Expt. Parasitology* 4(1): 62-86.
- METCALF, M. M. 1929. Parasites and the aid they give in problems of taxonomy, geographical distribution, and paleogeography. *Smithsn. Inst., Misc. Collect.* Vol. 81, No. 8. 36 pp.
- NIGRELLI, R. F., and H. W. STUNKARD. 1947. Studies on the genus *Hirudinella*, giant trematodes of scombriform fishes. *Zoologica* 31(13): 185-196.
- VIGUERAS, I. 1935. *Tristomum poeyi* n. sp. (Trematoda), parasito de *Makaira ampla* Poey (Pisces). *Nat. Hist. Soc. Cuba, Mem.* 9(1): 43-44.
- YAMAGUTI, S. 1938. Studies on the helminth fauna of Japan. Part 21. *Trematodes of Fishes, IV*. 139 pp. Maruzen Co., Tokyo.